

<https://github.com/Tuxae/Tuxae-Jupyter-Manager>

Setup Jupyter environments for data scientists

Technologies: Docker, Jupyter, Letsencrypt, Nginx proxy, Flask, UWSGI



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Github Tuxae



Tuxae

French student organization in Computer Science and Machine Learning at ENSAE Paris

📍 ENSAE Paris, Palaiseau (Paris Area), France

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★ 0

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JUPYTER FAQ </> 🎮 ⚙️ 🔍

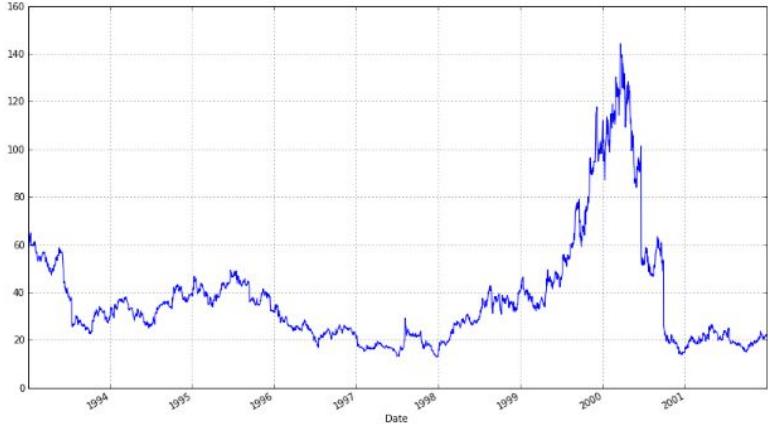
```
In [1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
plt.figure(1,4,8)

from zipline.algorithms import TradingAlgorithm
from zipline.transforms import MovingAverage, batch_transform
from zipline.utils.factory import load_from_yahoo
```

```
In [3]: data = pd.load('talk_px.dat') #data = load_from_yahoo(stocks=['AAPL', 'PEP', 'KO']); data.save('talk_px.dat')
```

```
In [4]: data['AAPL'].plot()
```

```
Out[4]: <matplotlib.axes.AxesSubplot at 0xa80784c>
```



```
In [5]: # Simplest possible algorithm
class BuyApple(TradingAlgorithm):
    def handle_data(self, data):
        self.order('AAPL', 1) # stock ('AAPL') to order and amount (=1 shares)
```

```
In [6]: my algo = BuyApple() # Instantiate our algorithm
results_buy_apple = my algo.run(data) # Backtest algorithm on dataframe.
```

```
[2012-10-26 15:19] INFO: Performance: Simulated 2267.0 trading days out of 2268.
[2012-10-26 15:19] INFO: Performance: first open: 1993-01-04 14:30:00+00:00
```

```
In [7]: print results_buy_apple
```

```
<class 'pandas.core.frame.DataFrame'>
DatetimeIndex: 2267 entries, 1993-01-04 21:00:00 to 2001-12-28 21:00:00
Data columns:
capital_used                2267 non-null values
cumulative_capital_used     2267 non-null values
ending_cash                  2267 non-null values
ending_value                 2267 non-null values
max_capital_used             2267 non-null values
max_leverage                 2267 non-null values
period_close                 2267 non-null values
period_open                  2267 non-null values
pnl                          2267 non-null values
portfolio_value               2267 non-null values
positions                   2267 non-null values
returns                      2267 non-null values
starting_cash                2267 non-null values
starting_value                2267 non-null values
transactions                 2267 non-null values
dtypes: float64(11), object(4)
```

```
In [8]: results_buy_apple.portfolio_value.plot()
```

```
Out[8]: <matplotlib.axes.AxesSubplot at 0xaf2c20c>
```



Finance

jupyter
nbviewer

In [6]:

In [6]:

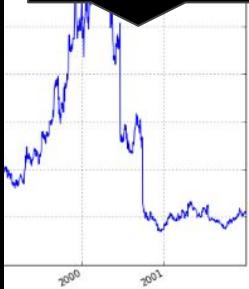
[201_

[2012_

In [7]: print result

```
pandas.core
Index: 226,
columns:
used
ive_capital_used
cash
value
capital_used
verage
close
open
positions
returns
```

TRO B1 LA THUNE



1



What do I need ??



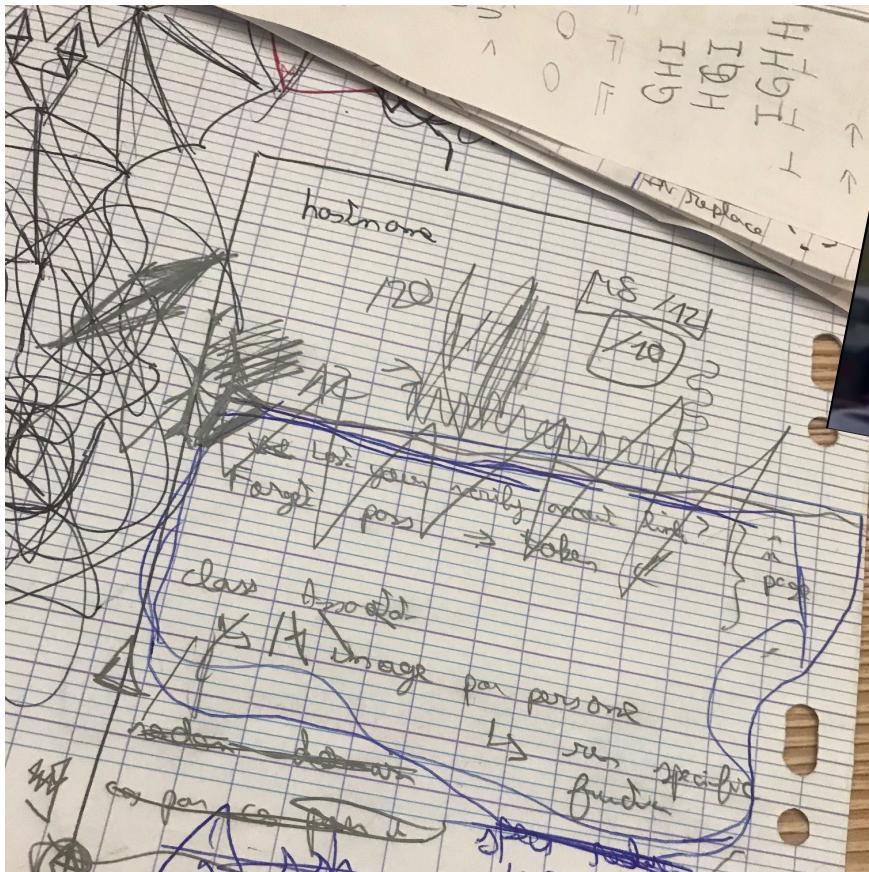
Step1: a well-rested body for more energy



Step1: a we...
body for more energy

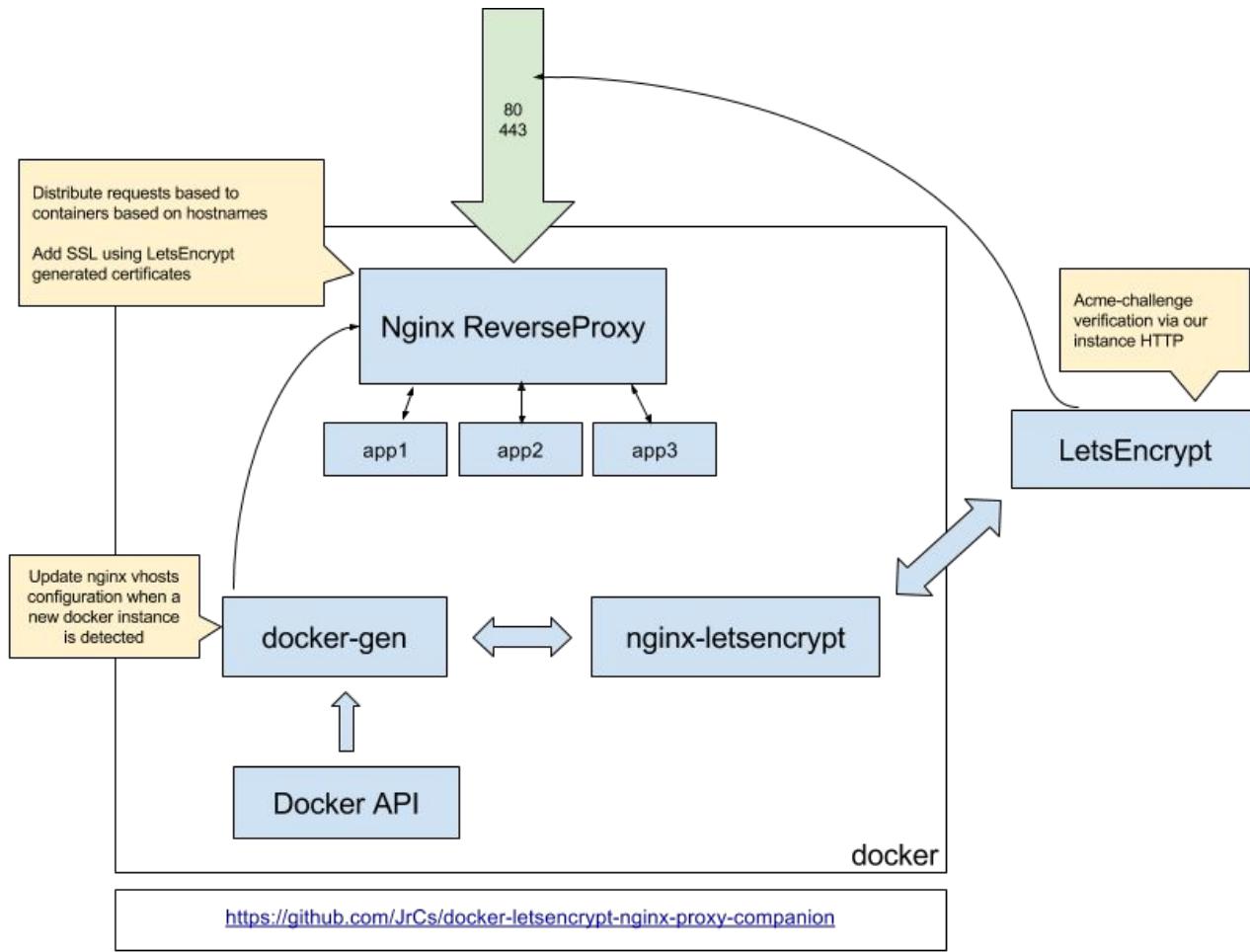


Step2: Take some organized notes

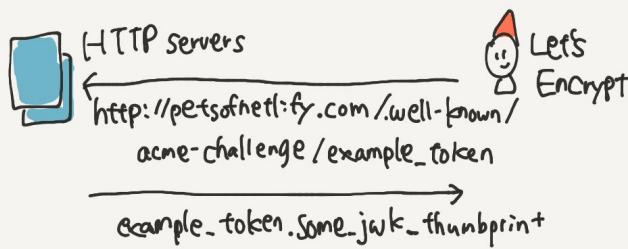


Let's work !

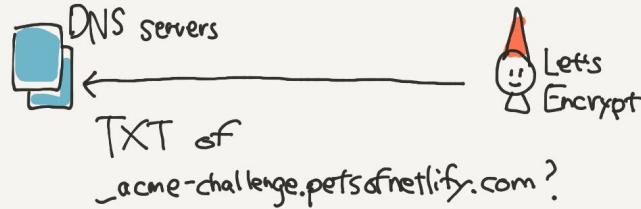




HTTP challenge



DNS challenge

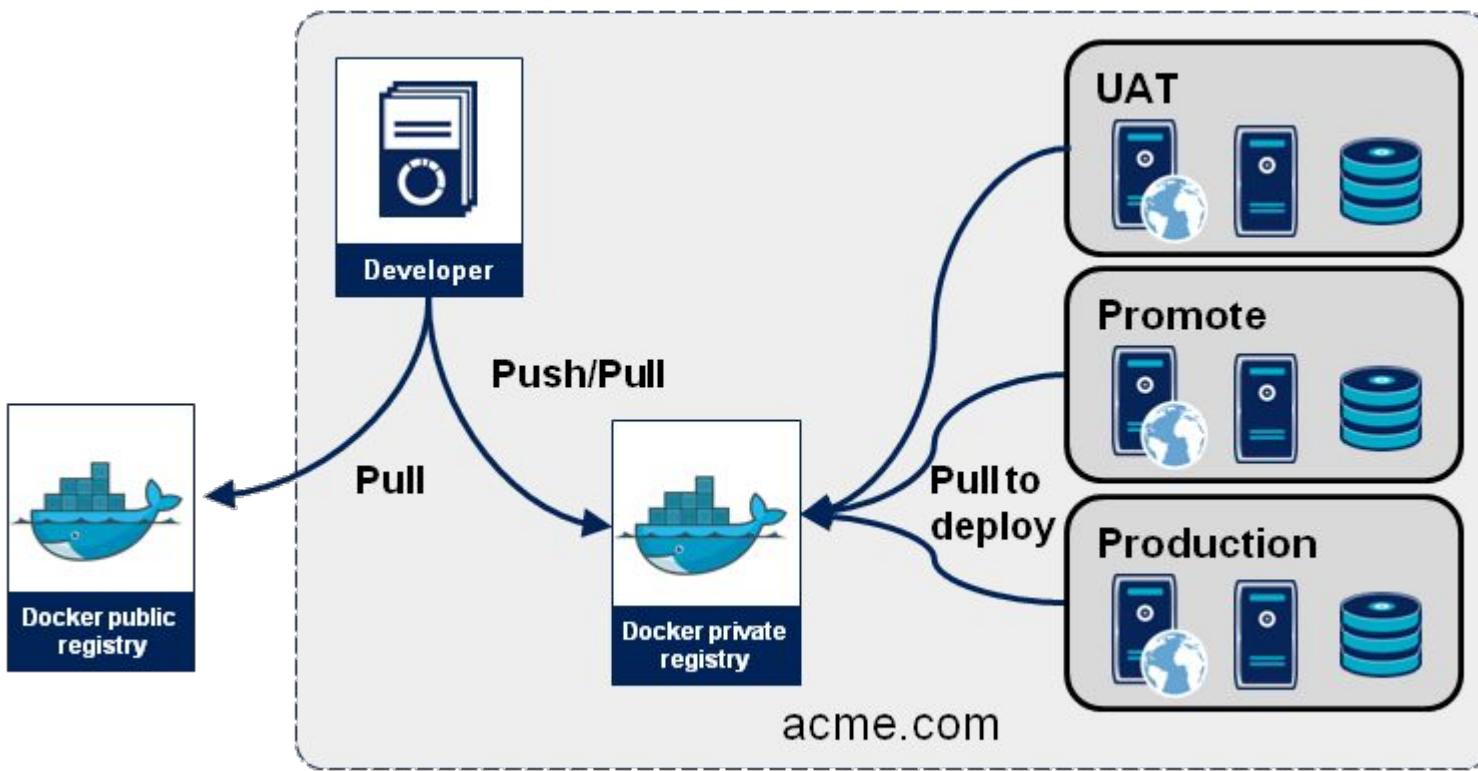


<https://letsencrypt.org/fr/docs/challenge-types/>
<https://thecustomizewindows.com/2017/04/what-is-caa-dns-record-and-how-to-add/>

DNS configuration

server.domain.tld.	0	A	157.159.191.54
*.domain.tld.	0	CNAME	server.domain.tld.
domain.tld.	0	CAA	0 issuewild "letsencrypt.org."





jupyter/scipy-notebook

[Source on GitHub](#) | [Dockerfile commit history](#) | [Docker Hub image tags](#)

jupyter/scipy-notebook includes popular packages from the scientific Python ecosystem.

- Everything in jupyter/minimal-notebook and its ancestor images
- pandas, numexpr, matplotlib, scipy, seaborn, scikit-learn, scikit-image, sympy, cython, patsy, statsmodel, cloudpickle, dill, numba, bokeh, sqlalchemy, hdf5, vincent, beautifulsoup, protobuf, and xlrd packages
- ipywidgets for interactive visualizations in Python notebooks
- Facets for visualizing machine learning datasets

jupyter/tensorflow-notebook

[Source on GitHub](#) | [Dockerfile commit history](#) | [Docker Hub image tags](#)

jupyter/tensorflow-notebook includes popular Python deep learning libraries.

- Everything in jupyter/scipy-notebook and its ancestor images
- tensorflow and keras machine learning libraries

jupyter/datascience-notebook

[Source on GitHub](#) | [Dockerfile commit history](#) | [Docker Hub image tags](#)



Docker registry

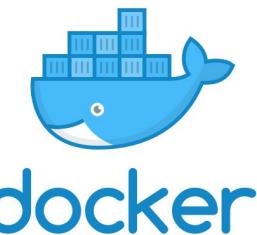
The web application provide an access to docker images from the local registry

Example to add an image to the local registry:

```
docker pull jupyter/datascience-notebook:latest
docker tag jupyter/datascience-notebook:latest 127.0.0.1:5000/datascience-notebook
docker push 127.0.0.1:5000/datascience-notebook
```

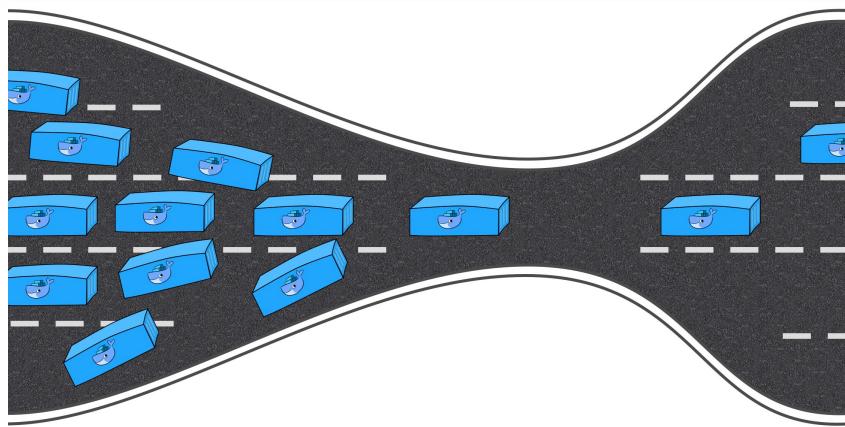
You can check available images on http://127.0.0.1:5000/v2/_catalog

```
curl http://127.0.0.1:5000/v2/_catalog
{"repositories":["datascience-notebook"]}
```



CPU/RAM

brainville — ubuntu@ubuntu16: ~ — ssh docker01 — 151x5						
CONTAINER ID	NAME	CPU %	MEM USAGE / LIMIT	MEM %	NET I/O	BLOCK I/O
1c7eb5235562	eloquent_morse	0.00%	2.352MB / 256MB	0.92%	648B / 0B	0B / 0B
08b3ba3b8d08	happy_poitras	0.00%	1.344MiB / 7.796GiB	0.02%	828B / 0B	0B / 0B



■ SFR 22:50 53 %



HackinToshMaster
Messenger

Ouais c'est top ça

En RAM, ça va la plupart du temps

Sauf si tu taffes avec des images
mais c'est une autre histoire

Mais pour tout le reste c'est bon



C'est surtout en CPU que ça
merde

On adaptera au pire

Ouais tu m'étonnes

La plupart du temps, les mecs te
font des calculs avec une option
"nprocs=-1", ça use tous les
CPUs, les autres sont bâisés après
mdr



#TrueStoryDuHackathon



Ah les batards



Bah là tu pourras pas puisque docker
te limite



Aa



Storage limit issue

TUXAE

Dashboard

Report a problem

Dashboard

After running your container(s), you can click on the info button to show logs.
The service deployed will be accessible using the address from the environment variable "LETSENCRYPT_HOST"
Use the logs to fetch additional information such as development tokens or default passwords.

List of containers

Show 10 entries

Search:

Name	Image	Actions			
sweet_buck	127.0.0.1:5000/data				
	127.0.0.1:5000/data				

Showing 1 to 2 of 2 entries

Previous 1 Next

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Information

--storage-opt is supported only for overlay over xfs with
'pquota' mount option

OK

Fixing storage issue

1. In computing, OverlayFS is a file system for Linux. He has encountered a Union Mount for other file systems. It was merged into the Linux kernel in 2014, in kernel version 3.181.2.
2. XFS is a high-performance 64-bit log file system created by SGI for its IRIX operating system. In May 2000, SGI places XFS under the GPL license. XFS was ported to the Linux kernel in 2001. Since June 2014, XFS is supported by most Linux distributions, some of which are used as the default file system.
3. A disk quota is a limit set by a system administrator that restricts certain aspects of file system usage on modern operating systems. The function of setting quotas to disks is to allocate limited disk-space in a reasonable way.

Docker supports the following storage drivers:

- `overlay2` is the preferred storage driver, for all currently supported Linux distributions, and requires no extra configuration.
- `aufs` is the preferred storage driver for Docker 18.06 and older, when running on Ubuntu 14.04 on kernel 3.13 which has no support for `overlay2`.
- `devicemapper` is supported, but requires `direct-lvm` for production environments, because `loopback-lvm`, while zero-configuration, has very poor performance. `devicemapper` was the recommended storage driver for CentOS and RHEL, as their kernel version did not support `overlay2`. However, current versions of CentOS and RHEL now have support for `overlay2`, which is now the recommended driver.
- The `btrfs` and `zfs` storage drivers are used if they are the backing filesystem (the filesystem of the host on which Docker is installed). These filesystems allow for advanced options, such as creating “snapshots”, but require more maintenance and setup. Each of these relies on the backing filesystem being configured correctly.
- The `vfs` storage driver is intended for testing purposes, and for situations where no copy-on-write filesystem can be used. Performance of this storage driver is poor, and is not generally recommended for production use.

https://wiki.archlinux.org/index.php/Disk_quota



Fixing storage issue

Storage quota per container - overlay2 backed by xfs

■ Open Source Projects ■ Docker Engine docker



vishr Vishal Rana

Sep '17

Hi,

In my setup, docker daemon is running with overlay2 storage backed by xfs. Following this <https://docs.docker.com/engine/reference/commandline/run/#set-storage-driver-options-per-container> document I found that I need to mount / with pquota option to able storage quota per container, so I edited /etc/fstab to include pquota option like /dev/md1 / xfs defaults,pquota 0 0 , but I am not able to run a container like below

```
root@n1:~# docker run -it --storage-opt size=120G fedora /bin/bash
docker: Error response from daemon: --storage-opt is supported only for overlay over xfs with
'pquota' mount option.
See 'docker run --help'.
```

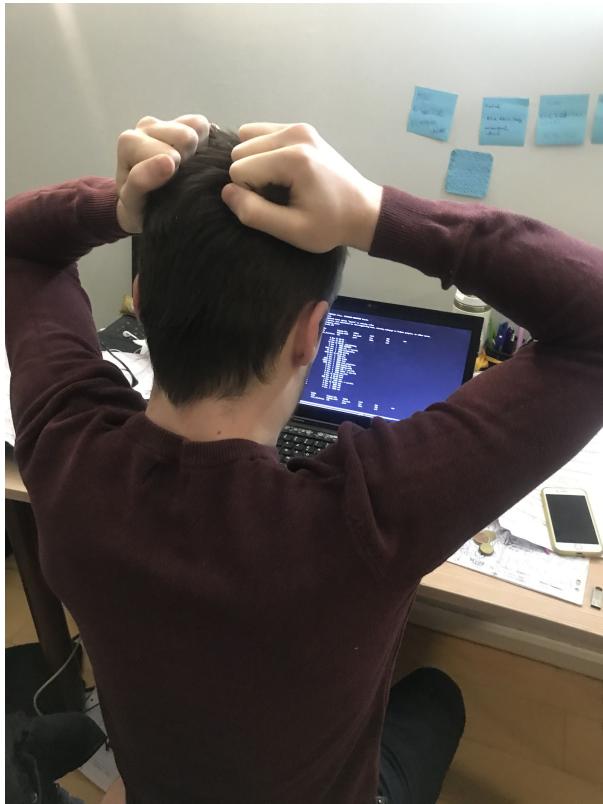
Do I need to follow any other steps?

Solved by vishr in post #2

I had to update /etc/default/grub with the following entry:
GRUB_CMDLINE_LINUX_DEFAULT="rootflags=uquota,pquota"

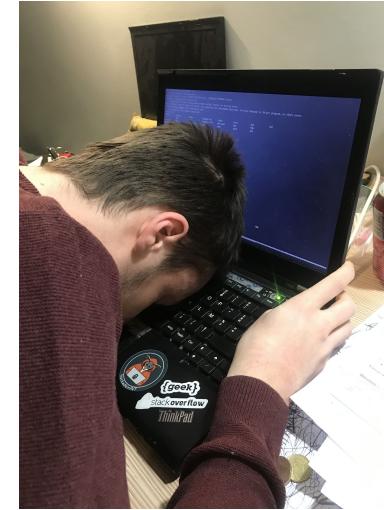


Fixing storage issue



```
# password is required to access the cryptlu volume:  
Enter passphrase for /dev/sda2:  
: performing fsck on '/dev/mug/root'  
/dev/mapper/mug-root: clean, 1633034/4587520 files, 15006968/18350000 blocks  
: mounting '/dev/mug/root' on real root  
[ 9.477291] EXT4-fs (dm-2): Unrecognized mount option "uquota" or missing value  
mount: /new_root: wrong fs type, bad option, bad superblock on /dev/mapper/mug-root, missing codepage or helper program, or other error.  
You are now being dropped into an emergency shell.  
sh: can't access tty: job control turned off  
rootfs # ls  
VERSION config hooks keymap.bin lib64 root sys var  
bin dev init keymap.utf8 new_root run tmp usr  
buildconfig etc init_functions lib proc sbin  
firmware lib64 modules proc sysroot
```

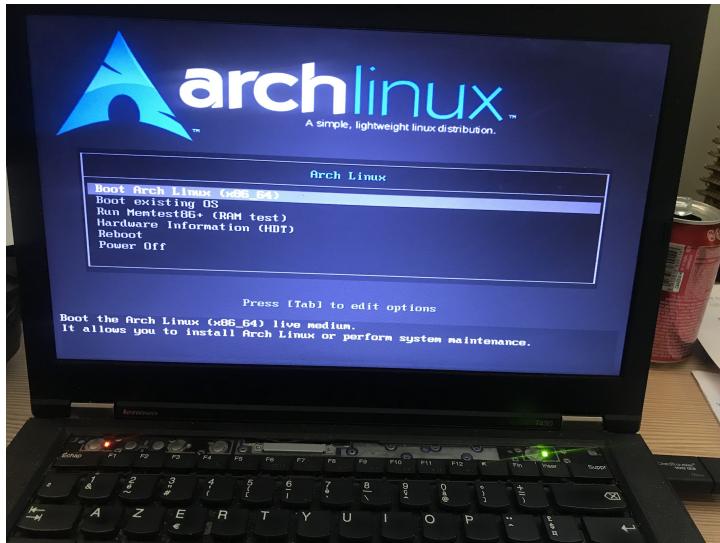
CANNOT BOOT !!



Fixing storage issue

```
arch Linux 5.3.13-arch1 (tty1)
archiso login: root (automatic login)

root@archiso ~ # lsblk
NAME MAJ:MIN RM TYPE MOUNTPOINT
loop0 7:0 0 524.5M 1 loop /run/archiso/sfs/airootfs
sda 8:0 0 298.1G 0 disk
└─sda1 8:14 0 266M 0 part
└─sda2 8:18 0 297.9G 0 part
sdb 8:16 0 298.1G 0 disk
└─sdb1 8:17 0 500M 0 part
└─sdb2 8:18 0 293G 0 part
└─sdb3 8:19 0 54.9G 0 part
└─sdb4 8:20 0 3.1G 0 part
sdc 8:32 1 14.4G 0 disk
└─sdc1 8:33 1 630M 0 part /run/archiso/bootmnt
└─sdc2 8:34 1 60M 0 part
root@archiso ~ # losetup -f
root@archiso ~ # cryptsetup luksOpen /dev/sda2 yolo
Enter passphrase for /dev/sda2:
cryptsetup luksOpen /dev/sda2 yolo 6.59s user 0.41s system 140% cpu 4.987 total
root@archiso ~ # mount /dev/mapper/yolo-root /mnt
root@archiso ~ # mount /dev/mapper/yolo-home /mnt/home
root@archiso ~ # mount /dev/sda1 /mnt/boot
root@archiso ~ # arch-chroot /mnt
root@archiso ~# /bin/sh /etc/default/grub
root@archiso ~# grub-mkconfig -o /boot/grub/grub.cfg
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-linux
Found initrd image: /boot/initramfs-linux-fallback.img
Found fallback initrd image(s) in /boot: initramfs-linux-fallback.img
done
root@archiso ~# ^C
root@archiso ~# exit
130 root@archiso ~# umount -R /mnt
root@archiso ~#
```

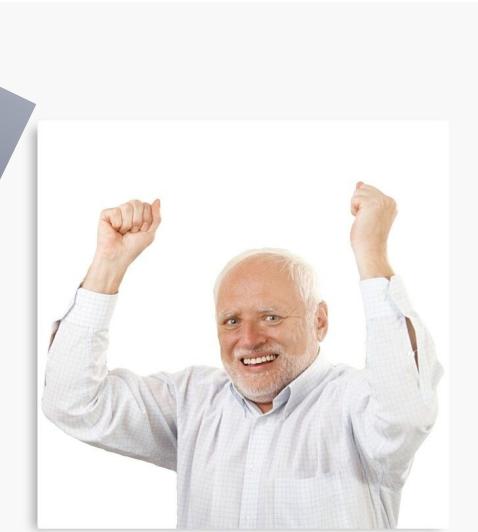


Trying to fix this mess from live OS

Then reboot and pray...



Fixing storage issue



System fixed but no solution...



Fix

 zteed committed 2 minutes ago

Showing 1 changed file with 8 additions and 4 deletions.

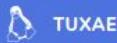
1 parent 1cd0898

commit fddb531dc28ec9038e50e6378182acd6b11eb405

Unified Split

```
diff --git a/app/src/docker_interface/docker.py b/app/src/docker_interface/docker.py
--- a/app/src/docker_interface/docker.py
+++ b/app/src/docker_interface/docker.py
@@ -71,11 +71,15 @@ def deploy_container(docker_client: docker.client.DockerClient, image: str, curr
     environment=environment,
     volumes=volumes,
     cpu_count=cpus,
-    mem_limit=f'{mem}m',
+    storage_opt=[
+        'size': '10G'
+    ],
     mem_limit=f'{mem}m'
 )
 """
storage_opt=[
     'size': '10G'
 ]
 TODO: find a way to use storage-opt
--storage-opt is supported only for overlay over xfs with 'pquota' mount option
"""
flash(f'Container successfully created.<br>
Your container service will be available soon:<br>
< a href="https://{{host}}>https://{{host}}</a><br>
```

solution...



TUXAE

Dashboard



aurelien



Dashboard

[Report a problem](#)

After running your container(s), you can click on the info button to show logs.

The service deployed will be accessible using the address from the environment variable "LETSENCRYPT_HOST"

Use the logs to fetch additional information such as deployment tokens or default passwords.

Choose a docker image from local registry

127.0.0.1:5000/datasience-notebook:latest ▾

✓ Run

List of containers

Show 10 entries

Search:

User	Name	Image	Status	Actions
aurelien	sleepy_kirch	127.0.0.1:5000/datasience-notebook:latest	running	

Showing 1 to 1 of 1 entries

Previous 1 Next



TUXAE

Dashboard



aurelien

Dashboard

Report a problem

After running your container
The service deployed will be available
Use the logs to fetch additional information

Choose a docker image

127.0.0.1:5000/dataservice

List of containers

Show 10 entries



Information

Container successfully created.
Your container service will be available soon:
<https://aurelien-409865.jupyter.tuxae.fr>
Check logs for more information.

OK

ENCRYPT_HOST

Run

Search:

User	Name	Image	Status	Actions



Password or token: Log in

Token authentication is enabled

If no password has been configured, you need to open the notebook server with its login token in the URL, or paste it above. This requirement will be lifted if you [enable a password](#).

The command:

```
jupyter notebook list
```

will show you the URLs of running servers with their tokens, which you can copy and paste into your browser. For example:

```
Currently running servers:  
http://localhost:8888/?token=c8de56fa... :: /Users/you/notebooks
```

or you can paste just the token value into the password field on this page.

See [the documentation on how to enable a password](#) in place of token authentication, if you would like to avoid dealing with random tokens.

Cookies are required for authenticated access to notebooks.





TUXAE



Dashboard

After running your container, the service deployed will be available at the address indicated below. Use the logs to fetch additional information.

Choose a docker image

127.0.0.1:5000/docker

List of containers

User

aurelien

Showing 1 to 1 of 1



Information

```
PATH=/opt/conda/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
HOSTNAME=797b27ef8908
VIRTUAL_HOST=aurelien-409865.jupyter.tuxae.fr
LETSENCRYPT_HOST=aurelien-409865.jupyter.tuxae.fr
LETSENCRYPT_EMAIL=aurelien@uboc.xyz
VIRTUAL_PORT=8888
JUPYTER_ENABLE_LAB=yes
DEBIAN_FRONTEND=noninteractive
CONDA_DIR=/opt/conda
SHELL=/bin/bash
NB_USER=jovyan
NB_UID=1000
NB_GID=100
LC_ALL=en_US.UTF-8
LANG=en_US.UTF-8
LANGUAGE=en_US.UTF-8
HOME=/home/jovyan
MINICONDA_VERSION=4.7.10
MINICONDA_MDS=c945f2b3335c7b2b15130b1b2dc5cf4
CONDA_VERSION=4.7.12
XDG_CACHE_HOME=/home/jovyan/.cache/
JULIA_DEPOT_PATH=/opt/julia
JULIA_PKGDIR=/opt/julia
JULIA_VERSION=1.2.0

Executing the command: jupyter lab
[I 10:24:20.472 LabApp] Writing notebook server cookie secret to /home/jovyan/.local/share/jupyter/runtime/notebook_cookie_secret
[I 10:24:22.114 LabApp] JupyterLab extension loaded from /opt/conda/lib/python3.7/site-packages/jupyterlab
[I 10:24:22.115 LabApp] JupyterLab application directory is /opt/conda/share/jupyter/lab
[I 10:24:23.495 LabApp] Serving notebooks from local directory: /home/jovyan
[I 10:24:23.495 LabApp] The Jupyter Notebook is running at:
[I 10:24:23.495 LabApp] http://797b27ef8908:8888/?token=8d2f9e96509ba8713e596a3bde7565b7d3c01cbe97b08855
[I 10:24:23.495 LabApp] or http://127.0.0.1:8888/?token=8d2f9e96509ba8713e596a3bde7565b7d3c01cbe97b08855
[I 10:24:23.496 LabApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 10:24:23.500 LabApp]
```

To access the notebook, open this file in a browser:
file:///home/jovyan/.local/share/jupyter/runtime/nbserver-6-open.html
Or copy and paste one of these URLs:
http://797b27ef8908:8888/?token=8d2f9e96509ba8713e596a3bde7565b7d3c01cbe97b08855
or http://127.0.0.1:8888/?token=8d2f9e96509ba8713e596a3bde7565b7d3c01cbe97b08855

OK

Search:



Previous 1 Next



Password or token:

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```
Currently running servers:  
http://localhost:8888/?token=c8de56fa... :: /Users/you/notebooks
```

or you can paste just the token value into the password field on this page.

See [the documentation on how to enable a password](#) in place of token authentication, if you would like to avoid dealing with random tokens.

Cookies are required for authenticated access to notebooks.



+ ☰ ↻ ⌂

Name Last Modified

/ work an hour ago

Launcher

Notebook

Python 3 Julia 1.2.0 R

Console

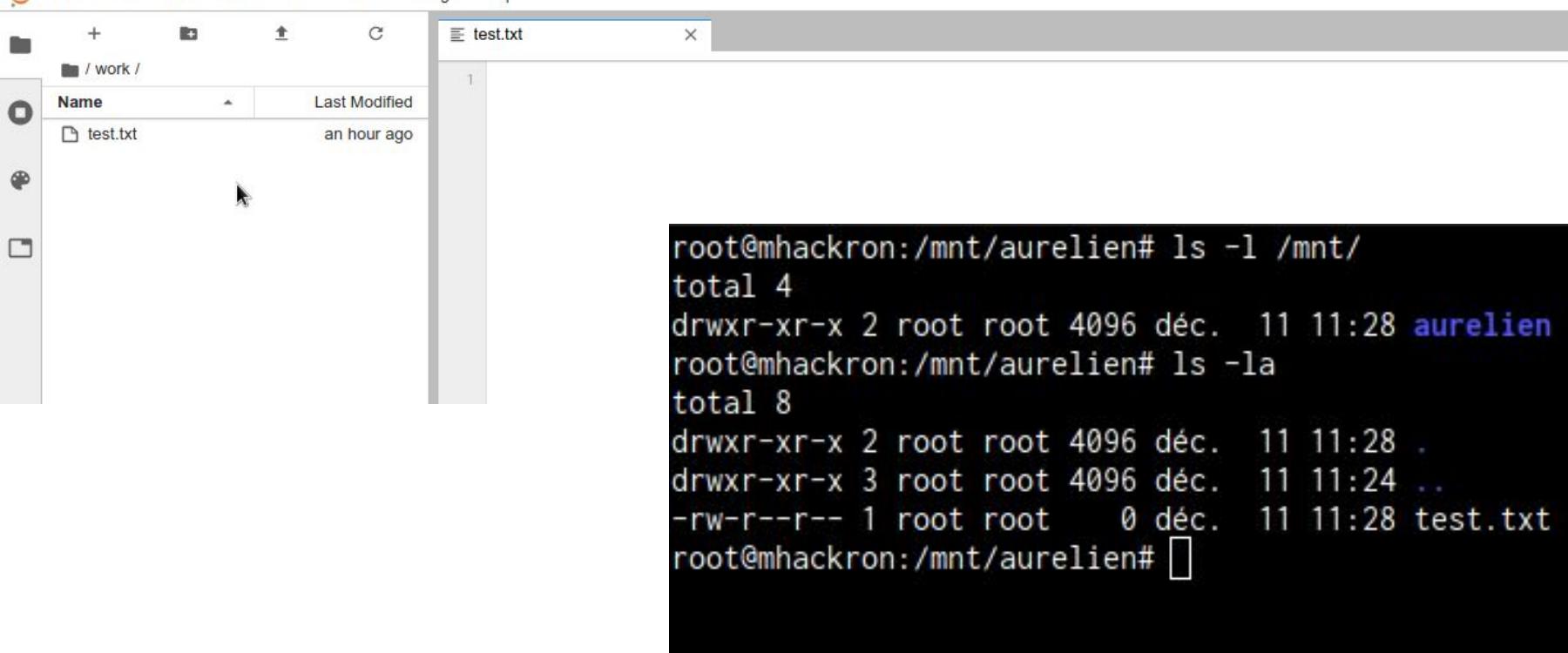
Python 3 Julia 1.2.0 R

Other

\$_

Launcher





The screenshot shows a terminal window titled "test.txt" running on a Linux system. The terminal displays the output of two "ls" commands. The first command, "ls -l /mnt/", shows a directory entry for "aurelien" with permissions "drwxr-xr-x" and a size of "4096". The second command, "ls -la", shows the same directory entry plus a file entry for "test.txt" with permissions "-rw-r--r--" and a size of "0". Both entries were modified on December 11 at 11:28.

```
root@mhackron:/mnt/aurelien# ls -l /mnt/
total 4
drwxr-xr-x 2 root root 4096 déc. 11 11:28 aurelien
root@mhackron:/mnt/aurelien# ls -la
total 8
drwxr-xr-x 2 root root 4096 déc. 11 11:28 .
drwxr-xr-x 3 root root 4096 déc. 11 11:24 ..
-rw-r--r-- 1 root root 0 déc. 11 11:28 test.txt
root@mhackron:/mnt/aurelien# 
```



Security issue



Security issue

Prevent user to access /home from host (used by sshd service)

master

zteeed committed 4 hours ago

Showing 1 changed file with 1 addition and 1 deletion.

app/src/docker_interface/docker.py

```
diff --git a/app/src/docker_interface/docker.py b/app/src/docker_interface/docker.py
@@ -52,7 +52,7 @@ def deploy_container(docker_client: docker.client.DockerClient, image: str, curr
     f'JUPYTER_ENABLE_LAB=yes'
 
     volumes = [
-        f'/home/{username}',
+        f'/mnt/{username}':
             {
                 'bind': '/home/jovyan/work',
                 'mode': 'rw'
             }
     ]
 }
```

1 parent 95656ae

commit 9895c9d7f0a8a295caf80e8a48b5c1aad5e307da

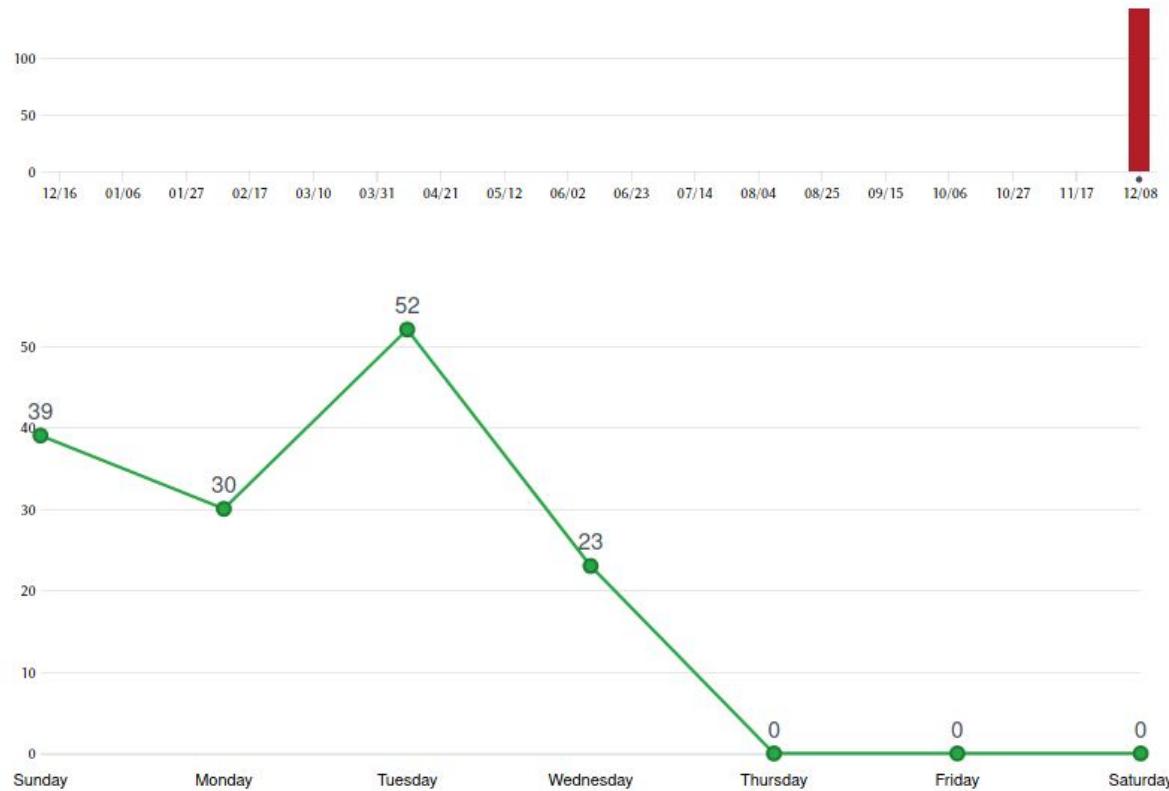
Unified Split



THUMBS UPSIR

imagegenerator.net



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